



**Pole for Doctoral Studies
Center for Doctoral Studies
Sciences, Technologies, and Medical Sciences**

ANNOUNCEMENT OF DOCTORAL THESIS DEFENSE



Ms. TALIMI Hasnaa

**Will present here research work with the aim of earning a
Doctorate**

**Doctoral program: Engineering sciences and techniques
Discipline: Engineering Sciences
Specialty: Bioinformatics / Computer Science**

**On 04/07/2025 at 14H30 at the Dr. Othman Filali Mknassi
Conference Hall, National School of Applied Sciences of Tangier
Under the Theme**

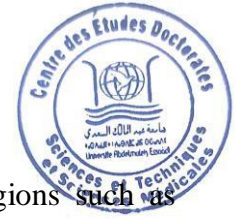
Multidisciplinary approaches for studying cutaneous leishmaniasis in Morocco: bioinformatics pipeline, development of predictive modeling and Artificial Intelligence-aided mobile diagnostic application

Front of the jury composed of :

First Name & Last Name	Establishment	Designation
Pr. BADIR Hassan	ENSA of Tangier, UAE	President
Pr. MOUSSA Ahmed	ENSA of Tangier, UAE	Reviewer
Pr. CHAHBOUNE Rajaa	FMP of Tangier, UAE	Reviewer
Pr. MESTARI Mohamed	ENSET oh Mohammedia, UHUU	Reviewer
Pr. ATTARIUAS Hicham	ENCG of Tangier, UAE	Examiner
Pr. RIYAD Myriam	FMP of Casablanca, UHII	Examiner
Dr. LEMRANI Meryem	Pasteur Institute of Morocco, Casablanca	Co-supervisor
Pr. FISSOUNE Rachida	ENSA of Tangier, UAE	Supervisor

Research Laboratory: Data and Systems Engineering Research Team (IDS)

Abstract



Cutaneous leishmaniasis (CL) is a major public health issue in endemic regions such as Morocco, where *Leishmania (L.) tropica* is one of the predominant pathogens. Understanding its genetic diversity, modes of transmission, and diagnosis is essential for effective disease control. This thesis integrates three complementary disciplines to propose approaches for the study of CL: genomic analysis, predictive epidemiology, and automated diagnosis using Artificial Intelligence(AI).

Firstly, a Whole Genome Sequencing (WGS) analysis of *L. tropica* was performed using an optimized GIP pipeline, enabling an in-depth exploration of its genetic diversity and adaptation mechanisms. Secondly, six Machine Learning (ML) models were evaluated to predict future CL cases based on climatic and epidemiological data, through an interactive form. Thirdly, a mobile application based on Deep Learning (DL) was developed to support CL diagnosis, particularly suited for healthcare professionals in low-resource settings.

Our multidisciplinary approach yielded significant results by combining Bioinformatics and AI to strengthen strategies for CL surveillance, diagnosis, and management, while enhancing public health tools.

Keywords: Cutaneous Leishmaniasis; WGS; Bioinformatics; Machine Learning; Deep Learning; Artificial Intelligence.